K22U 1566

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree CBCSS (OBE) Regular/Supplementary/ Improvement Examination, April 2022

(2019 Admission Onwards)

COMPLEMENTARY ELECTIVE COURSE IN MATHEMATICS

4C04MAT-CS : Mathematics for Computer Science – IV

Time : 3 Hours Max. Marks : 40

PART – A

Answer **any four** questions. **Each** question carries **1** mark.

1. Define Graph.
2. Draw complete graph on 5 vertices.
3. What is the error in Simpson's rule ?
4. What is meant by optimal solution of LPP ?
5. Write the objective function of a transportation problem. **(4×1=4)**

PART – B

Answer **any seven** questions. **Each** question carries **2** marks.

6. Draw two non-isomorphic graphs.
7. Draw Petersen graph.
8. What are the three components of an LP model ?
9. What are the necessary basic assumptions for all LP problems ?
10. Write down Modified Euler method.
11. Write the following LPP in standard form.

    Min $z = 3x_1 - 2x_2 + x_3$

    Subject to $x_1 + 2x_2 + 3x_3 \geq 5$

    $2x_1 + x_2 \leq 3$

    $x_1 + 2x_3 \geq 2$

    $x_1, x_2, x_3 \geq 0$

12. Evaluate $\int_{-1}^{1} x^3 dx$ using Simpson's one-third rule.

P.T.O.

13. Find an IBFS to the following TP by North-West Corner method.

11	8	3	4	6
14	3	4	7	10
5	2	8	1	10
4	8	8	6	

14. Explain degeneracy in a transportation problem.
15. Write down Taylor's series method to solve first order differential equations. **(7×2=14)**

PART – C

Answer **any four** questions. **Each** question carries **3** marks.

16. In any graph, prove that there is an even number of odd vertices.
17. Show that k-cube Q_k has 2^k vertices.
18. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal rule with h = 0.5.
19. Given $y' = -y, y(0) = 1$, determine y(0.01) by Euler method.
20. Explain canonical and standard forms of LPP.
21. Explain Least-Cost method.
22. Write down the steps to find an IBFS to a transportation problem by Vogel's approximation method. **(4×3=12)**

PART – D

Answer **any two** questions. **Each** question carries **5** marks.

23. State and prove fundamental theorem of Graph Theory.
24. Solve Max $z = 7x_1 + 5x_2$

    Subject to $x_1 + 2x_2 \leq 6$

    $4x_1 + 3x_2 \leq 12$

    $x_1, x_2 \geq 0$
25. Solve the following TP.

21	16	25	13	11
17	18	14	23	13
32	27	18	41	19
6	10	12	15	43

26. Using Runge-Kutta method of fourth order, find y(0.1) correct to 4 decimal places if $y' = -y, y(0) = 1$. **(2×5=10)**